R E P O R T R E S U M E S

ED 013 292 VT 000 621

IDENTIFYING HORTICULTURAL PLANTS. HORTICULTURE-SERVICE OCCUPATIONS, MODULE NO. 2.

OHIO STATE UNIV., COLUMBUS, CENTER FOR VOC. EDUC.
REPORT NUMBER OSU-AGDEX-200-017-2 PUB DATE AUG 65
EDRS PRICE MF-$0.25 HC-$1.44 36P.

DESCRIPTORS- *TEACHING GUIDES, UNITS OF STUDY (SUBJECT FIELDS), *VOCATIONAL AGRICULTURE, *ORNAMENTAL HORTICULTURE OCCUPATION, VOCABULARY, *PLANT IDENTIFICATION, *HORTICULTURE, HIGH SCHOOLS, BIBLIOGRAPHIES,

THE MAJOR OBJECTIVE OF THIS GUIDE IS TO DEVELOP THE ABILITY TO IENTIFY COMMON PLANTS THAT ARE IMPORTANT TO THE ORNAMENTAL HORTICULTURIST. IT WAS DEVELOPED BY A NATIONAL TASK FORCE ON THE BASIS OF DATA FROM A NUMBER OF STATE STUDIES. IT IS ONE OF A SERIES DESIGNED TO PREPARE HIGH SCHOOL STUDENTS FOR HORTICULTURE-SERVICE OCCUPATIONS. SUGGESTIONS FOR INTRODUCING THE MODULE ARE GIVEN. SUBJECT MATTER AREAS ARE (1) VOCABULARY, (2) SCIENTIFIC NOMENCLATURE, AND (3) PLANT IDENTIFICATION. EACH AREA INCLUDES SUGGESTED SUBJECT MATTER CONTENT, TEACHING-LEARNING ACTIVITIES, AND INSTRUCTIONAL MATERIALS AND REFERENCES. SEVERAL SUGGESTIONS FOR EVALUATING EDUCATIONAL OUTCOMES ARE ALSO GIVEN. THE MODULE IS SCHEDULED FOR 85 HOURS OF CLASS INSTRUCTION. A TEACHER WITH A BACKGROUND IN HORTICULTURE MAY USE IT TO PLAN A UNIT FOR LESS ABLE HIGH SCHOOL STUDENTS WITH AN OCCUPATIONAL GOAL IN ORNAMENTAL HORTICULTURE. THIS DOCUMENT IS AVAILABLE FOR A LIMITED PERIOD AS PART OF A SET (VT 000 619 - 000 631) FOR $7.25 FROM THE CENTER FOR VOCATIONAL AND TECHNICAL EDUCATION, THE OHIO STATE UNIVERSITY, 980 KINNEAR ROAD, COLUMBUS, OHIO 43212. (JM)

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IDENTIFYING HORTICULTURAL PLANTS

One of Twelve Modules in the Course Preparing for Entry in

HORTICULTURE - SERVICE OCCUPATIONS

Module No. 2

The Center for Research and Leadership Development

in Vocational and Technical Education

The Ohio State University
980 Kinnear Road
Columbus, Ohio, 43212

The development of these materials was supported by a grant
from the
Division of Adult and Vocational Research
United States Office of Education

August, 1965

VT000621

M E M O R A N D U M

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Supplementary Information on Instructional Material

Provide information below which is not included in the publication. Mark N/A in each blank for which information is not available or not applicable. Mark P when information is included in the publication. See reverse side for further instructions.

(1) Source of Available Copies:
Agency The Center for Vocational and Technical Education
Address 980 Kinnear Road, Columbus, Ohio 43212
Limitation on Available Copies No Limit Price/Unit $7.25/set
(quantity prices)

(2) Means Used to Develop Material:
Development Group National Task Force
Level of Group National
Method of Design, Testing, and Trial Part of a funded project of the USOE, OE-5-85-009; materials based on research from state studies; see preface material in the course outline.

(3) Utilization of Material:
Appropriate School Setting High School
Type of Program High school class in horticulture--service occupations
Occupational Focus Service workers at nurseries, garden centers, greenhouses, etc.
Geographic Adaptability Nationwide
Uses of Material Instructor course planning
Users of Material Teachers

(4) Requirements for Using Material:
Teacher Competency Background in horticulture
Student Selection Criteria Designed for the less able high school student, goal in horticulture service occupations.
Time Allotment Estimated time listed in module. (P)

Supplemental Media --
Necessary x
Desirable
(Check Which)

Describe Suggested references given in module. (P)

Source (agency)
(address)

IDENTIFYING HORTICULTURAL PLANTS

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IDENTIFYING HORTICULTURAL PLANTS

Major Teaching Objective

To develop the ability to identify common plants which are important to the ornamental horticulturist.

Suggested Time Allotments

At School

Class instruction	35 hours	
Laboratory experience	50 hours	
Total at school		85 hours
Occupational experience		0 hours
Total for module		85 hours

Suggestions for Introducing the Module

The teacher is cautioned in preparing for and teaching this module that he is not working with above average students who will be going on to college. Instead, he is working with students who will become greenhouse workers, nursery workers, golf course employees, assistant groundskeepers, cemetary employees, and parks employees. Consequently, the instruction must be geared to the lower ability levels of such persons. While it has been necessary to include some technical material in this module for teacher use, it is not intended that such material be used without modification in terms of wording and language so as to be easily understood by students.

Present the following sketches to the class and then ask questions similar to the ones below.

"A pilot knows the planes which he flies."

"A mechanic knows the tools which he uses."

"A horticulture student knows the plants which he grows and uses."

Does it make any difference to a pilot whether the plane is a Piper Cub, a multi-engined transport, a turbo jet, or a jet? Yes, it does. He is going to do more things to fly a four-engined plane than he will do to fly a single engine plane such as a Piper Cub.

Does it make any difference whether or not a mechanic knows of the right tool for a particular job? Of course, it does.

Does it make any difference to a horticulturist whether a plant is a poinsettia or a marigold? Yes, it does. The horticulturist will have to apply more technical knowledge in growing a good poinsettia than he will in growing a good marigold. You can't treat all plants as though they were identical. It does make a difference what kind of plant one is dealing with.

Does it make any difference whether or not the horticulturist knows which is the right plant for a particular location in the landscape? Of course it does.

These examples serve to point out that a worker must be able to identify and use correctly the "tools of his trade."

Why should a person preparing for jobs in greenhouses or landscape horticulture be able to identify plants?

1. Customers ask for plants either by name or by giving a description. Only a person with a knowledge of plants can do a good job of serving these customers with speed and efficiency.

2. Employees may be called on to perform the following tasks which depend upon knowing how to identify plants:

   a. To move a particular kind of plant or plants from one growing area to another

   b. To fill a customer's order for plants

   c. To load a delivery vehicle with specific kinds of plants

   d. To bring particular kinds of plants from the transporting vehicle to the planting site

   e. To remove weeds from a flower bed or nursery field

   Employees having the ability to do the above kinds of jobs without specific directions from the employer, will have better possibilities of staying on the job on a regular basis.

3. In order to provide the proper growing environment and to carry out the essential cultural practices for good plant growth, it is necessary to identify the plant to be grown.

4. In order to properly control weeds in the landscape with herbicides, it is necessary to distinguish between weeds and the desirable ornamentals.

From the above sketches, these points can be made:

1. Can you imagine a doctor helping sick people without knowing all about their parts and the way in which the parts work?

2. Can you imagine a cook making a good cake without knowing the recipe and the ingredients called for by the recipe?

3. Can you imagine a quarterback being a good football player without knowing his teammates or the plays?

4. Can you imagine a horticulture student being real successful in growing or caring for plants if he or she didn't know considerable about them (what they are like, what they need to grow, how to keep them healthy)?

Competencies to be Developed

I. To develop the vocabulary needed to describe plants

Teacher Preparation

Subject Matter Content

Automobiles are made up of such parts as: wheels, engines, seats, body, transmission, windows, headlights, etc. Plants are also made up of several parts. These parts are called: roots, stems, leaves, flowers, fruits, seeds, etc.

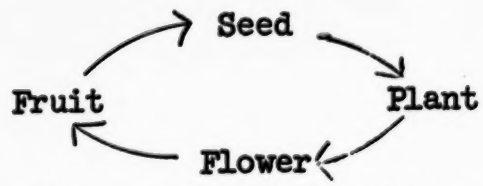
All automobiles are not built exactly the same and neither are plants. Due to different body styles, different kinds of engines, and different types of accessories we have Fords, Chevrolets, Dodges, Plymouths, Pontiacs, Cadillacs, Volkswagens, Ramblers, and a host of others.

Since plants, too, differ as to their parts, growth habits, and life cycles, various words have been chosen to describe them. Just as we need certain words to talk about cars, baseball, and guns, we also need certain words to talk about plants.

The following are terms which describe plants based on their life cycles or growth habits.

annual
biennial
perennial
herbaceous plant
woody plant
cool-season plant
hardy plant
tender plant
ground cover
tree
shrub
edible plant
warm-season plant
foliage plant
nursery plant
bedding plant
evergreen
conifer
narrow leaf evergreen
broadleaf evergreen
deciduous plant
vine
poisonous plant
weed
small fruit
tree fruit

Annual: A plant living one year or less. During this time the plant grows, blooms, produces seeds and dies.



A diagram of a plant life cycle

Examples of annuals are petunias, marigolds, zinnias, green beans, and radishes.

Biennial: A plant which requires two years or parts of two years to complete its life cycle. Examples of biennials are cabbage, beets, and carrots.

Perennial: A plant which normally lives more than two years. Examples of perennials are asparagus, rhubarb, iris, trees, and shrubs.

Herbaceous (succulent): A plant described as having a soft, non-woody stem. Generally these plants only live and grow for one season.

Woody plant: A plant whose above ground stem persists over winter and is woody or somewhat woody.

Small fruit: A fruit such as grape, strawberry, blackberry, raspberry, currant, or gooseberry harvested from a vine or bramble-type plant.

Tree fruit: Fruits borne on trees such as apples, pears, peaches, etc.

Cool-season plants: Plants which grow best when the temperature is cool.

Warm-season plants: Plants which grow best at relatively high temperatures.

Hardy plant: A plant which can withstand low winter temperatures.

Tender plant: A plant not capable of withstanding low winter temperatures.

Foliage plant: A plant grown for its leaves rather than for flowers or fruit.

Nursery plant: An ornamental plant raised for landscape purposes.

Bedding plant: An annual type plant used for planting flower beds in the landscape.

Evergreen: A plant that has leaves all through the year.

Pot plant: A flowering plant grown, sold, and used in a flower pot.

Conifer: A cone bearing plant.

Narrow leaf evergreen: A plant with needle-like or scale-like leaves which are retained the year round.

Broadleaf evergreen: An evergreen with broad, not needle-like leaves.

Deciduous plant: A plant which loses its leaves during the fall.

Vine: Any plant whose stem requires support, and which climbs by tendrils or other means or which creeps along the ground.

Ground cover: Plant materials that are low growing or which creep along the ground. They improve the appearance of the ground and often times hold soil and prevent erosion.

Tree: A woody perennial usually having a single main stem which commonly exceeds ten feet in height.

Shrub: A low, usually several-stemmed woody plant. Shrubs are commonly called bushes, but this is not good terminology.

Edible plant: A plant which can be safely eaten.

Poisonous plant: A plant causing harmful effects when eaten or brought into contact with humans or animals.

Weed: A plant not intentionally sown whose undesirable qualities outweigh its good points. A weed can be thought of as "a plant out-of-place."

Suggested Teaching-Learning Activities

1. Place a model car and a blooming plant on the demonstration desk. Compare the model car with the plant. Emphasize that both cars and plants have different parts. Give examples of automobile parts and then give examples of plant parts. Emphasize the need for vocabulary in describing automobile parts. Emphasize the need for vocabulary in describing plants.

2. Issue the students good seed and nursery catalogs. Ask the students to page through the catalogs, noting the various words used to describe plants. The students should encounter such words as annuals, perennials, hardy plant, shrub, tree, vine, ground cover, small fruit, etc. Using appropriate plant materials, explain and define the plant descriptive terms. Students should later receive a mimeographed copy of the definitions presented during the class.

3. Place a balled and burlapped narrow leaf evergreen, (such as Taxus) a blooming herbaceous plant, (such as an African violet or chrysanthemum) and a piece of sod or a container of growing grass on the demonstration desk. Prepare in advance a series of cards with one plant descriptive term as covered in class per card, and a board on which the cards can be mounted. Take each of the three plants as found on the demonstration desk, in turn, and ask the student volunteers to come up and mount cards descriptive of the plant on the board. Be sure that identification cards are made for each plant and that each card is placed at the top center of the board as each plant is being described.

Example of the board completed for the Taxus yew.

Taxus	
Perennial	Evergreen
Woody Plant	Narrow leaf Evergreen
Hardy Plant	Shrub
Nursery Plant	

If necessary to involve all the class members, use more plants which would be suitable for this activity.

Considerable repetition will probably be necessary to get the student familiar with, and at ease with, the vocabulary. This activity or similar activities may be appropriate for portions of several class periods.

4. Take the students on a field trip to the school landscape and as the various landscape plants are encountered, ask the students for appropriate descriptive terms for the plants.

5. Ask the students to turn in a short report describing a plant in which they are particularly interested using the vocabulary being studied.

6. Prepare a series of cards giving a general plant description and ask the students to suggest the name of a plant which fits the description by next class period. The cards may be rotated among the students until each student has satisfactorily completed the requirement for each card. Good seed and nursery catalogs can serve as reference materials.

   The card may look like this:

   > This plant is an annual. It is a tender, bedding plant which is grown for its pretty flowers.

   This description could describe a petunia, ageratum, marigold, or a number of other plants.

   A master chart can be prepared to trace students' accomplishment.

7. Suggested time to develop the competency

Classroom teaching	3	hours
School laboratory activity	12	hours
Total time	15	hours

Suggested Instructional Materials and References

Instructional materials

1. Small model car
2. Potted azalea, chrysanthemum, African violet, coleus, grass, geranium, tomato plant, rubber plant, English ivy, and dandelion.
3. Balled and burlapped or canned Taxus, Pfitzer Juniper, Rhodedendron, Glossy Abelia, and pine.
4. Cards (5" x 7")
5. 4' x 4' piece of plywood or cardboard

References

T*1. Janick. Horticultural Science, pp. 27-38.

*The symbol T (teacher) or S (student) denotes those references designed especially for the teacher or for the student.

II. To develop an understanding of the use of scientific names in identifying horticultural plants.

Teacher Preparation

Subject Matter Content

This material is for familiarization purposes only. It is not intended to be taught for the purpose of developing skill in the use of botanical names.

1. The two-name system for naming plants and animals originated from the work of the Swedish botanist, Carolus Linnaeus, in the eighteenth century.

2. The binomial system was adopted for two reasons:

   a. Common names, selected with no regular procedure or definite system, are confusing and misleading.

      Example of confusion--What is the difference between a woodchuck and a ground hog?

      Example of misleading nature--Is a starfish really a fish?

   b. Scientific names are definite and never duplicated; they are used in all the world and are usually descriptive.

      Example of binomial nomenclature--

      common name - Red maple

      scientific name - Acer rubrum

      Points to be made concerning this example include:

      1) The Crimson King Maple, a Norway maple, has red leaves and could be mistakenly called a red maple.

      2) The scientific name is made up of two names--the genus name and the species name.

      3) The scientific name is written in Latin because this language is specific and is taught in all countries of the world. This helps to eliminate confusion due to differences in language. (This language was also one of the foremost languages when plants were named.)

      4) The first name of the scientific name is the genus name. The genus name:

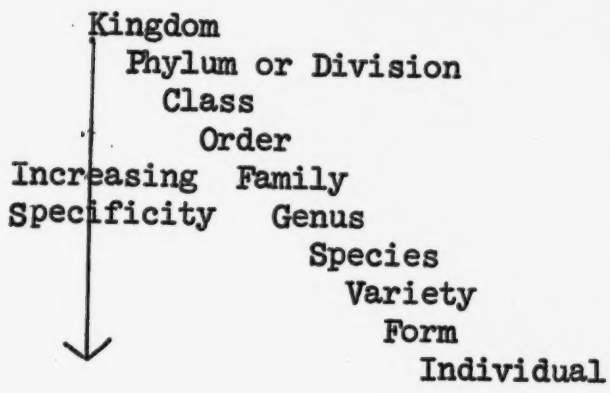
         a) Always begins with a capital letter
         b) Is usually a noun
         c) Is always written before the species name
         d) A genus is a group of closely related species.

      5) The second name of the scientific name is the species name. The species name:

         a) Always begins with a small letter
         b) Is usually an adjective
         c) Is written after the genus name.
         d) A species is a single kind of organism and consists of individuals having more or less similar characteristics.

6) The genus and species names are names taken from a scientific classification based on structural similarity.

7) The relationship of the genus and species groupings to the other groupings of the classification can be seen as follows:



8) An example of how the Red maple or Acer rubrum is fitted into this plan of classification is indicated below:

Kingdom - Plant
Phylum - Spermatophyta
Sub Phylum - Angiospermae
Class - Dicotyledonae
Order - Sapindales
Family - Aceraceae
Genus - Acer
Species - rubrum

9) Scientific names are widely used in the ornamental horticulture industry. Evidences of this fact include:

a) The rows of plants being offered for sale in the nursery and garden center are identified with signs bearing the scientific names of the plants.

b) Advertising materials prepared by nurserymen for the purpose of informing the public of items for sale often lists plants by their scientific names.

c) Plants in parks, arboretums, and conservatories are often identified with cards bearing the scientific names of the plants.

d) Nursery and seed catalogs list plants by their scientific names.

10) Workers in ornamental horticulture will have to deal with scientific names. Employees should know why these names are used and the purpose which they serve.

Suggested Teaching-Learning Activities

1. Place the following botanical names on the chalkboard: (Names more common to the geographical area may be substituted for these names.)

   a. Antirrhinum majus
   b. Acer saccharum
   c. Picea abies
   d. Pinus strobus
   e. Rhododendron catawbiense
   f. Syringa vulgaris

   Ask questions such as the following to stimulate interest.

   How many of you have ever seen names like this?

   Where did you see names like this?

   Why are names like this used?

   Why should we be concerned with names like this in a horticulture class?

   Teacher introduction:

   Some of you are probably saying by this time that "this is all Greek to me" and you know, you are just about right. These names come from the Latin or Greek language. Actually these words are the names for plants. Would you like to know what these plants are?

   a. Snapdragon
   b. Sugar Maple
   c. Norway Spruce
   d. White Pine
   e. Catawba Rhododendron
   f. Common Lilac

2. Discuss the reasons for using botanical names in horticulture. Point out that these names could be encountered in the following places:

   a. The nursery
   b. The city or state park
   c. The garden center
   d. Seed and nursery catalogs.
   e. Horticultural advertisements in newspapers and catalogs
   f. Horticulture books

3. Show the class specific examples of the use of botanical names in horticulture. Many garden centers and seed companies advertise plants by botanical names.

4. Emphasize that the students may not be required to use these names but that they should have some idea as to what the names are, and why they are used.

5. Suggested time to develop the competency

Classroom teaching	2	hours
School laboratory activity	0	hours
Total time	2	hours

Suggested Instructional Materials and References

Instructional materials

1. Plant tags or stickers listing the botanical names

2. Commerical literature using botanical names

3. Nursery and seed company wholesale catalogs which contain such information

References

T 1. Moon, Mann, and Otto. Modern Biology, Chapter 9.

T 2. Janick. Horticultural Science, Chapter 2.

T 3. Laurie and Ries. Floriculture: Fundamentals and Practices, Chapter 4.

III. To understand how the differences in plants can be used for purposes of identification

Teacher Preparation

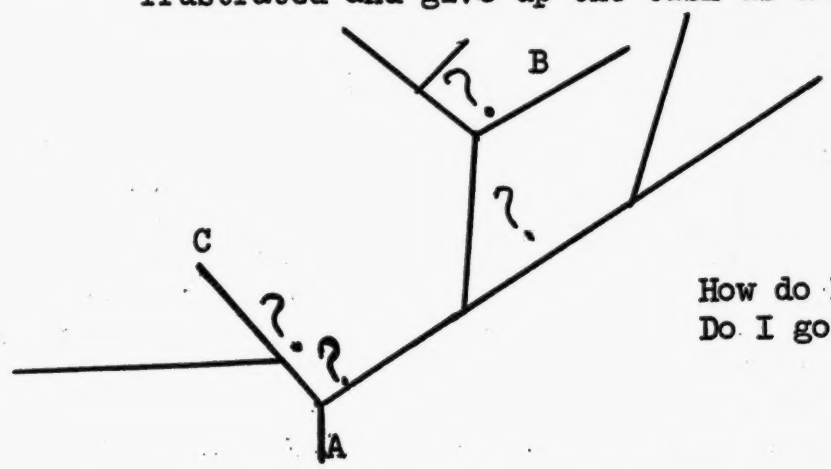
Subject Matter Content

This material is for familiarization purposes only. For example, it is not intended that at the level of below normal classes for which this module has been developed that students would learn to use plant keys.

There are different ways of identifying plants. Identification may be made by:

1. Using plant keys

   a. In order to be successful in using most plant keys, it is necessary to have a working knowledge of botanical terms. Anyone attempting to use plant keys without knowing the various botanical terms used to describe plants may soon become quite frustrated and give up the task as a hopeless cause.



How do I get from A to B? Do I go right or left?

   b. Using a plant key can be likened to taking a trip on a many forked road. One is constantly faced with making a decision. If the right decision is made each time a decision is called for, the traveler gets to the proper destination. If a wrong decision is made anywhere along the line, the destination will not be reached, and the traveler will be disappointed.

2. Comparing the plant in question with a series of pictures or sketches

   a. The comparison is more readily made if the pictures are in color and of the proper scale to show detail.

   b. This method has the limitations of having an incomplete picture or sketch series, the inability to visualize the third dimension, and the time needed to search through many pages of drawings hoping to come across the right picture.

3. Being told the identity of the plant by someone who knows the identity.

a. After learning the identity of the plant, it is necessary for the learner to look for the identifying characteristics that will make future identifications possible. This method is the preferred method for this course.

Plant Characteristics Which can be Used for Identification

Leaves

- Leaf shape
- Leaf margin
- Leaf bases
- Leaf apexes (to be explained in simple terms)
- Leaf attachment and arrangement on the stem
- Leaf venation
- Leaf ranking on the stem
- Leaf blade condition (lobed or unlobed)
- Leaf type (simple or compound)
- Leaf texture
- Leaf color
- Leaf aroma
- Leaf surface condition (smooth or hairy)

Stems

- Bark type
- Bark aroma
- Bark color
- Bud shape
- Bud location
- Bud arrangement and attachment
- Bud size
- Bud type
- Twig shape
- Twig texture
- Presence or absence of spines or thorns
- Number of bundle scars
- Shape of leaf scars
- Condition and color of pith
- Type of lenticels

Flowers

- Flower color
- Flower aroma
- Flower type
- Flower arrangement
- Flower parts
- Flower size
- Flower shape

Fruit

- Fruit color
- Fruit type
- Fruit shape

General plant characteristics

1. Shape and size of plant
2. Type of sap
3. Aroma or flavor

Following are some examples of plants which can be identified primarily on the basis of leaf shape. The teacher will be able to use others found locally.

Liquidambar styraciflua	Sweet gum	star shaped
Ginkgo biloba	Ginkgo	fan shaped
Liriodendron tulipifera	Tuliptree	tulip shaped
Quercus stellata	Post oak	cross shaped
Ficus pandurata	Fiddle leaf fig	violin shaped

Examples of plants which can be identified primarily on the basis of number of leaves or leaflets are:

Pinus strobus	White pine (5 needles to a cluster)
Aesculus hippocastanum	Horse chestnut (5-7 palmately compound leaves)

Examples of plants which can be identified primarily on the basis of aroma of crushed leaves are:

Tagetes	Marigold
Pelargonium	Geranium
Sassafras albidum	Sassafras
Lindera benzoine	Spicebush
Ailanthus altissima	Tree-of-heaven, Chinese sumac or Copal tree

Examples of plants which can be identified primarily on the basis of bark are:

Betula papyrifera	Paper birch
Carva ovata	Shagbark hickory

Examples of plants which can be identified primarily on the basis of flower fragrance or aroma are:

Lilac
Hyacinth
Honeysuckle

This table has been inserted for teacher reference only. The teacher's judgment and evaluation of his particular class will have to be used in determining what terms will be useful to and understood by the members of his class. For example, students entering most occupations for which the course is intended, such as parks employee or greenhouse worker, would not need to know the names of all the flower parts or flower types.

Plant Descriptive Terms as Related to External Structure, Growth Habits, and Origin of the Parts

Table I

External Structure	Type According to Growth Habit or Form	Type According to Origin
Root		
root tips	tap root	primary root
root cap	fleshy taproot	secondary root
root hairs	fibrous root	adventitious root
		brace root
		prop root
Stem		
terminal bud	herbaceous stem	aerial stem
axillary bud	woody stem	shortened
stalked bud		climbing
unstalked bud		erect
bud scar		underground stem
leaf scar		rhizome
bundle scar		tuber
bud scale scar		bulb
surface		corm
node		modified stem
internodes		stoln
lenticels		runner
bark		thorn
monocot stem		spine
dicot stem		

External Structure	Type According to Growth Habit or Form	Type According to Origin
Leaf		
blade	simple leaf	alternate leaves
margin	compound leaf	opposite leaves
mid vein	leaflet	whorled leaves
base	palmately compound leaf	sessile leaf
apex		
petiole	pinnately compound leaf	
stipule		
palmate venation	lobed leaf	
pinnate venation	unlobed leaf	
parallel venation	smooth leaf	
forked venation	hairy leaf	
	needle-like leaf	
	broadleaf	
	scale-like leaf	
Flower		
flower stalk	complete flower	
receptacle	incomplete flower	
calyx	perfect flower	
sepals	imperfect flower	
corolla	single flower	
petals	double flower	
stamen	composite flower	
filament	pistillate flower	
anther	head	
pollen grains	staminate flower	
pistil	raceme	
stigma	spike	
style	catkin	
ovary	umbel	
monocot flower	solitary	
dicot flower	panicle	

Bulb, Corm, and Rhizome Propagated Plants

Tulip	Crocus
Narcissus	Lily
Hyacinth	Gladiolus
	Iris

External Structure	Type according to Growth Habit or Form	Types According to Origin
Fruit		
	fleshy fruit	pome
	dry fruit	
peel	dehiscent fruit	drupe
rind	indehiscent fruit	berry
seam	pod	modified berry
calyx	capsule	aggregate fruit
stigma	nut	accessory fruit
fleshy layer	grain	multiple fruit
	achene	
	samara	

Seed

seed coat
hilum
micropyle
cotyledon scar
monocot seed
dicot seed

The following are some suggested plants to be used for identification purposes in the course. The teacher may find other plants of more importance locally.

Bedding Plants

Ageratum	Celosia	Phlox
Alyssum	Marigold	Portulaca
Aster	Nasturtium	Salvia
Fibrous rooted Begonia	Pansy	Snapdragon
	Petunia	Verbena
		Zinnia

Pot Plants

African violet (saintpaulia)	Christmas cherry	Geranium
	Chrysanthemum	Gloxinia
Azalea	Cineraria	Hydrangea
Begonia	Croft lily	Poinsettia
Calceolaria	Cyclamen	

Foliage Plants

Aglaonema species	Palm species
Dieffenbachia species	Peperomia species
Dracaena species	Philodendron species
Ficus species	Pothos species
Maranta species	Sansevieria species
Nephthytis species	Schefflera species

There are many other foliage plants which can be added to this listing

Cut Flowers

Aster
Carnation
Chrysanthemum
Gladiolus
Iris
Orchid
Rose
Sweet peas
Snapdragon
Stock

Narrowleaf Evergreens

Arborvitae
Cypress
Fir
Hemlock
Juniper (or Red cedar)
Pine
Spruce
Yew

Broadleaf Evergreens

Pieris
Azalea
Barberry
Box
English Ivy
Euonymus
Firethorn
Holly
Honeysuckle
Hollygrape
Mountain laurel
Periwinkle
Rhododendron
Viburnum

Deciduous Shrubs

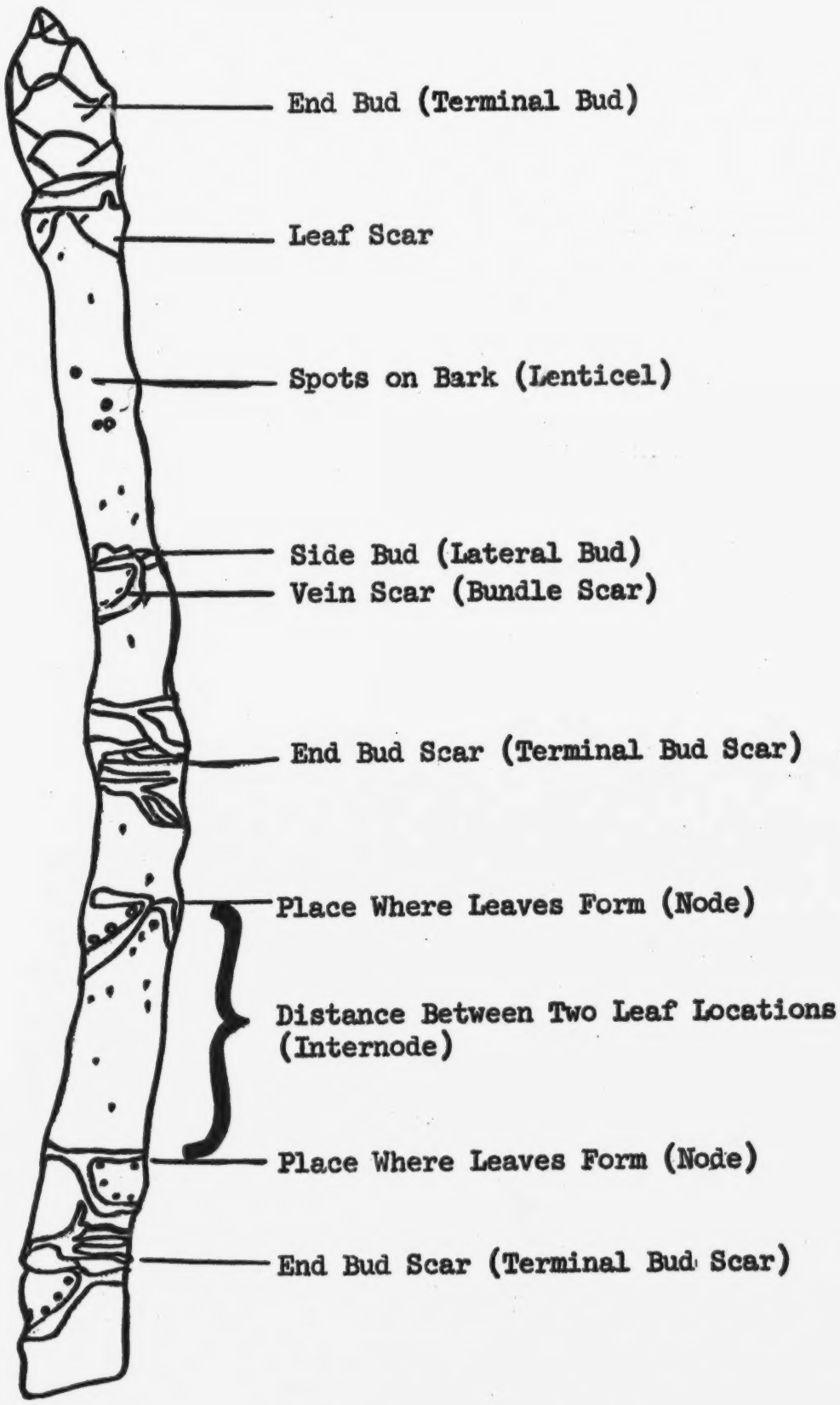
Glossy Abelia
Flowering Almond
Cotoneaster
Deutzia
Honeysuckle
Lilac
Mockorange
Privet
Flowering quince
Spirea

Trees

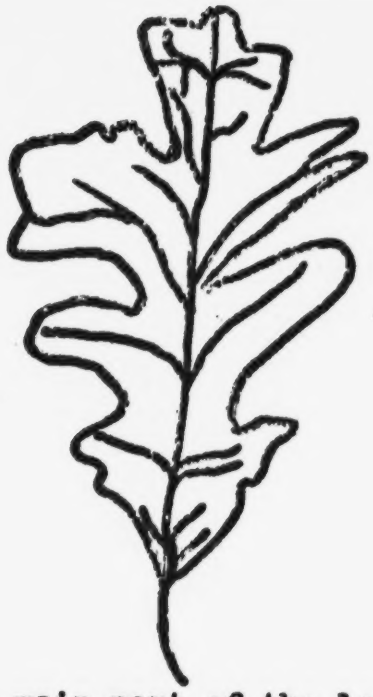
Ash
Beech
Birch
Crabapple
Dogwood
Gingko
Hawthorn
Honeylocust
Hornbeam
Horse chestnut
Linden
Magnolia
Maple
Mountainash
Oak
Pagodatree
Planetree
Redbud
Serviceberry
Sweetgum
Tuliptree
Tupelo
Zelkova
(and many others)

Weeds found in the local area may also be included in the study of plant identification.

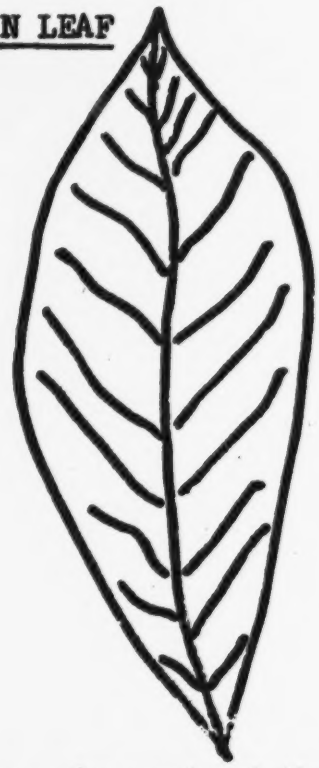
PARTS OF A WOODY STEM


End Bud (Terminal Bud)
Leaf Scar
Spots on Bark (Lenticel)
Side Bud (Lateral Bud)
Vein Scar (Bundle Scar)
End Bud Scar (Terminal Bud Scar)
Place Where Leaves Form (Node)
Distance Between Two Leaf Locations (Internode)
Place Where Leaves Form (Node)
End Bud Scar (Terminal Bud Scar)

DIFFERENCES IN THE MAIN LEAF

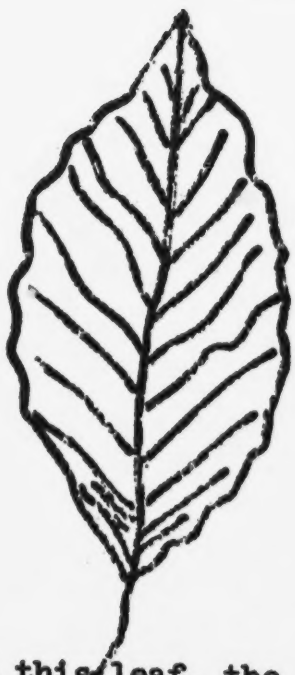


The main part of the leaf is cut up. (lobed)



The main part of the leaf is not cut up (entire)

DIFFERENCES IN LEAF VEINS

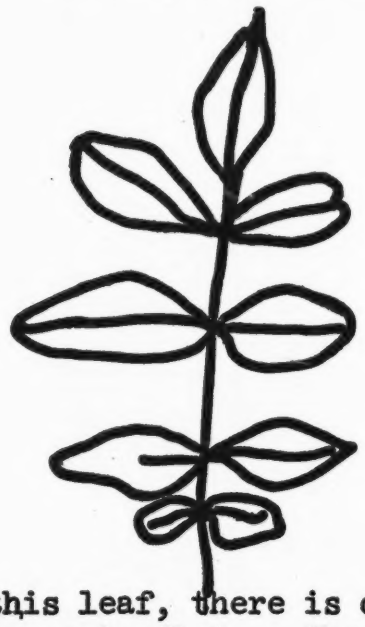


In this leaf, the veins are arranged like the quills in a bird feather. (pinnate)

In this leaf, the veins are arranged like the extended fingers of a hand (palmate)

In this leaf, the veins go up and down the leaf but never cross one another. (parallel)

DIFFERENCE BETWEEN TWO LEAVES, EACH WITH ONE LEAF STALK AND MANY LEAFLETS

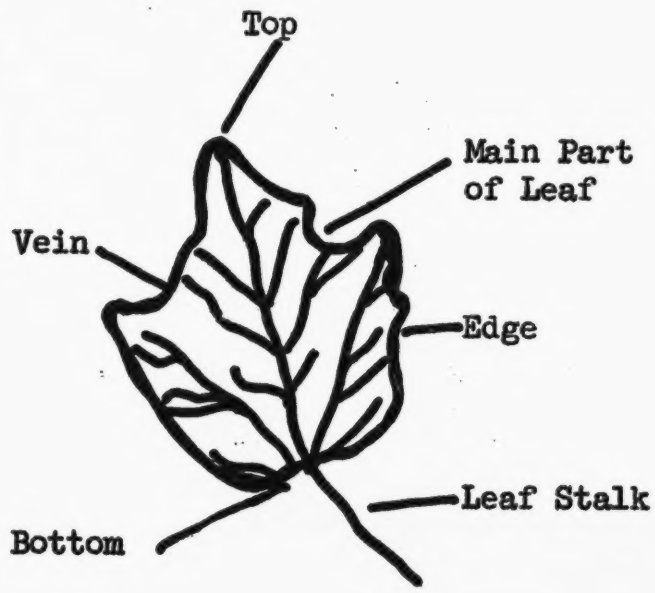


In this leaf, there is one stalk but many leaflets. The leaflets in this leaf go out from the main stalk like the quills of a bird feather. (pinnately compound)

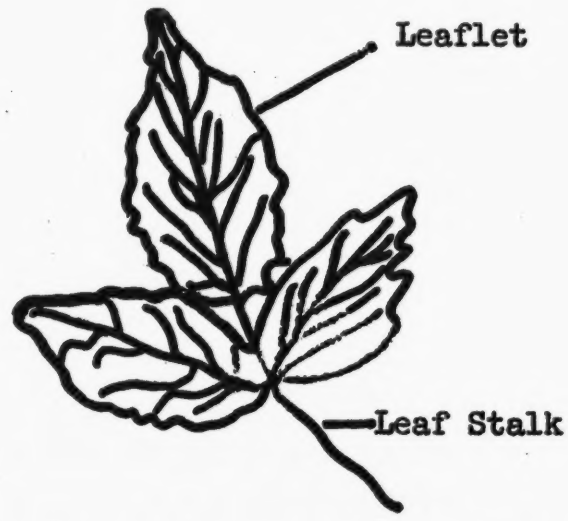
In this leaf, there is one stalk but also many leaflets. The leaflets in this leaf go out from a point like the extended fingers of a hand. (palmately compound)

Some plants like red bud trees have very broad leaves.

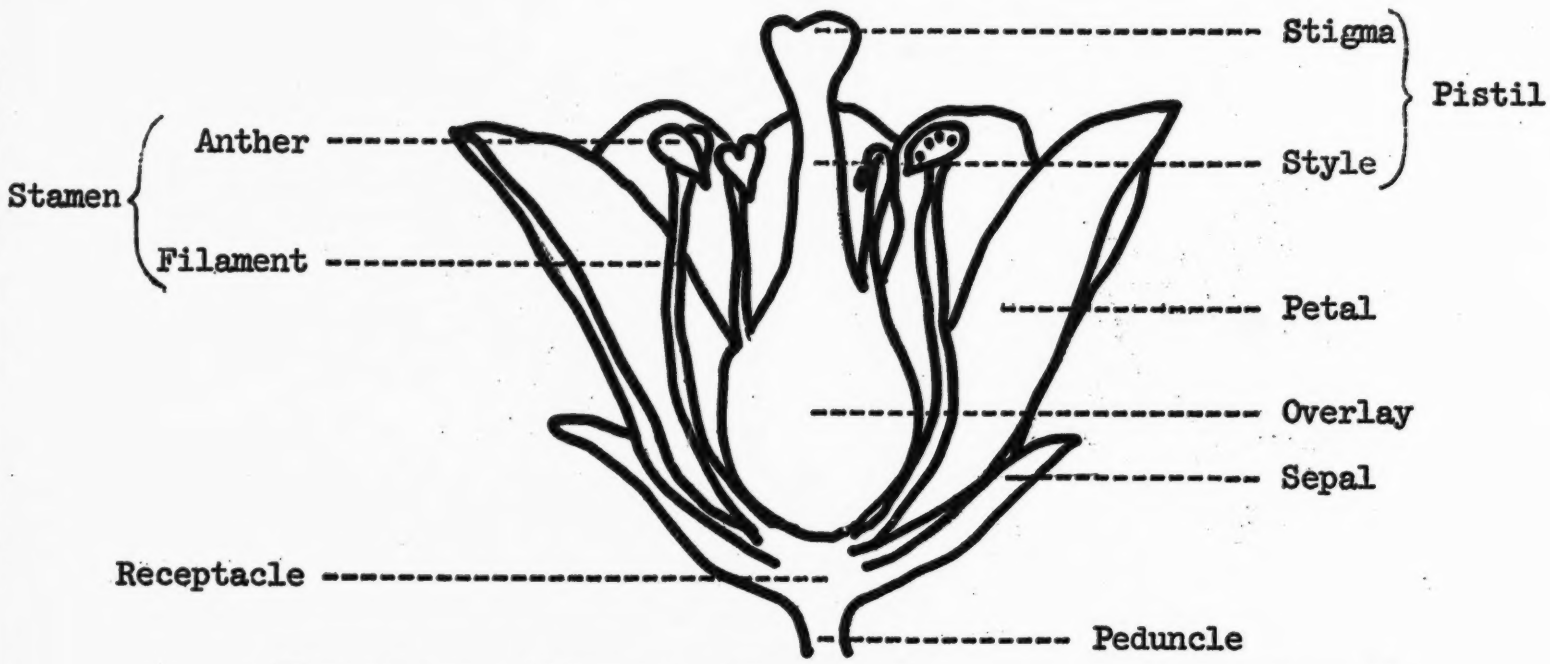
Some plants like pine trees have very narrow, needle-like leaves.



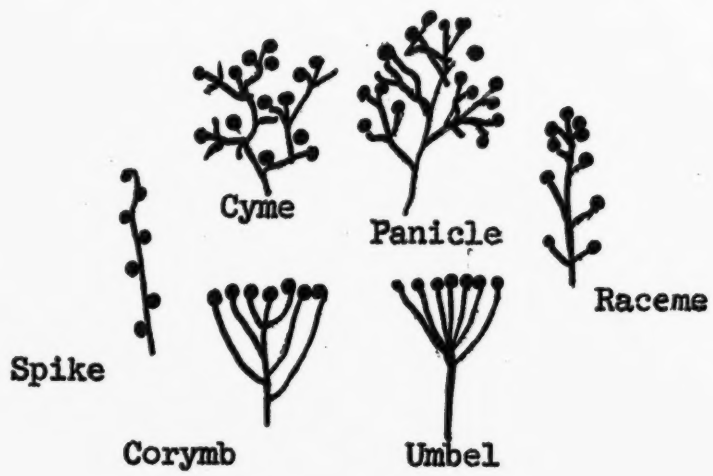
In this leaf, there is <u>one leaf stalk</u> but only <u>one blade</u>.



In this leaf, there is <u>one leaf stalk</u> but <u>more than one leaflet</u>.



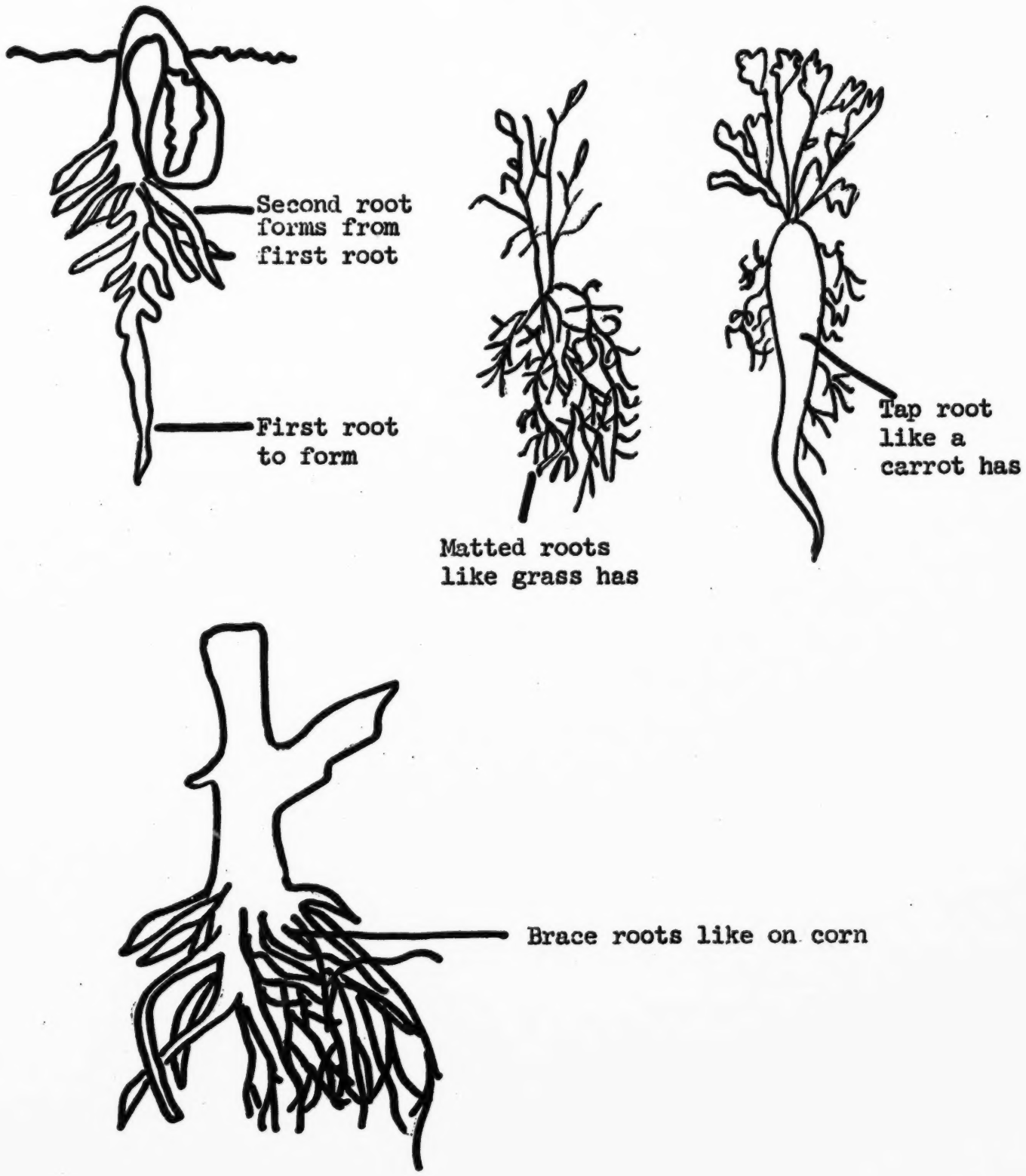
Flowers have different shapes, colors, and arrangement on the flower stalk.



Inflorescence of different types

KINDS OF ROOTS

Diagramatic Representation of the Plant
Descriptive Terms as Found in Table 1


Second root forms from first root
First root to form
Matted roots like grass has
Tap root like a carrot has
Brace roots like on corn

Suggested Teaching-Learning Activities

1. It is suggested that the teacher prepare a list of plants common to the geographical area in which the course is offered for the following categories:

   a. Bedding plants

   b. Bulb, corm, and rhizome propagated plants

   c. Cut flowers

   d. Deciduous shrubs

   e. Foliage plants

   f. Narrowleaf evergreens

   g. Pot plants

   h. Trees

   i. Weeds

2. One approach to the teaching of plant identification without the use of botanical keys is to use the "learn one-plant-a-day approach." By this method the teacher will bring in one plant a day and discuss it thoroughly by:

   a. Giving the common name and spelling for the plant under study.

   b. Pointing out the outstanding characteristics of the plant which will help to recognize or identify it in the future. These characteristics might include the shape and coloration of the leaf, shape of the flower, fragrance or peculiar aroma, color and type of flower, or the general shape of the plant.

   c. Comparing the plant currently under study with plants studied previously.

   Considerable time should be devoted to reviewing the plants previously studied. Keep the instruction cumulative. Review identification of selected plants previously studied before discussing the plant for the day. Repetition is the keynote to teaching by this method.

The students should be made well aware of the goal of learning one new plant a day. Stress the point that if the student can learn just one new plant a day, then at the end of a 180 school day year, 180 plants will be known. If the course is a two-year course, then 360 will have been learned. If the student extends the goal by using the summer months or by learning more than one plant a day, the graduate of the course should be able to identify a considerable number of plants.

If the teacher is to keep up with the goal of identifying one plant per day, some careful pre-planning will be required. It is suggested that frequent trips be made to the school landscape during the nice days of spring and fall in order to use these plants most effectively. During inclement weather, foliage plants, pot plants, and balled and burlapped or canned plants can be brought into the classroom. It may be necessary to work out some arrangements with local florists and nurserymen in order to have an adequate supply of plants for a day by day approach to learning the plants of the trade.

3. In order to get the students to become more aware of basic plant differences, it is suggested that for the first several classes, that the teacher would bring in plants which are considerably different and point out in detail the various ways in which the plants differ. The plants should be carefully chosen to exhibit the characteristics to be emphasized in the class discussion.

4. The more able students could learn to identify plants by comparing the plants to be identified with suitable pictures, sketches, or plant specimen mounts.

5. Prepare individual 5 x 7 cards of the various ways in which plants differ using actual plant materials. The students may be actively involved in this project. It would also be desirable to have the students prepare plant specimen mounts or make leaf impressions.

6. Suggested time for developing this competency

*Classroom teaching	30	hours
School laboratory activity	35	hours
Total	65	hours

*Based on ten minutes per day for 180 days.

Suggestions for Evaluating Educational Outcomes of the Module

1. Any examinations given should be practical in nature. Such examinations might consist of placing various plant specimens on the student desks and allowing the students to move from station to station identifying the plants. One minute for each plant should be sufficient time for identification purposes.

2. Make spot checks on student progress in identifying plants by requesting individual students to go to the greenhouse or shade house and bring in specific plants that are to be used for class instruction.

3. Take field trips to the school land laboratory, and by casual questioning, determine if the students know the plants.

4. Bring in newspaper or magazine articles containing nursery or garden center advertisements using the botanical names for the plants, and ask the students why these names are being used.

5. As occasions arise, ask the students to describe various plants. What words do they use in describing the plants?

6. Ask each student at various times during the course to assemble a group of plants for use in the school landscape.

Sources of Suggested Instructional Materials and References

Instructional materials

1. Seed and nursery catalogs as made available by the various commercial firms

2. Plant tags obtained from commercial firms

Teacher references

1. Janick, Jules. Horticultural Science, San Francisco: W. H. Freeman Company, 1963. Price: $8.50.

2. Laurie, Alex and Ries, Victor. Floriculture: Fundamentals and Practices, New York: McGraw-Hill. Price: $11.

3. Moon, Thurman, Mann, Paul, and Otto, James. Modern Biology, New York: Henry Holt and Company, 1956. Approximately $6.

4. State University College of Forestry at Syracuse University, Trees, Shrubs and Vines, 1961. Price: $1.25. Send remittance with order to Department of Forest Extension, State University College of Forestry, Syracuse 10, New York.

Student references

John Bradshaw's, "Guide to Better Gardening," Series of booklets. New York: Leland Publishing Company, Limited. These books sell for 69 cents each and are distributed by the Vaughn Seed Company, Downer's Grove, Illinois. They contain many color pictures of plants.

THE CENTER FOR RESEARCH AND LEADERSHIP DEVELOPMENT
IN VOCATIONAL AND TECHNICAL EDUCATION
THE OHIO STATE UNIVERSITY
980 KINNEAR ROAD
COLUMBUS, OHIO, 43212

INSTRUCTOR NOTE: As soon as you have completed teaching each module, please record your reaction on this form and return to the above address.

1. Instructor's Name_____

2. Name of school_____State_____

3. Course outline used: _____Agriculture Supply--Sales and Service Occupations
   _____Ornamental Horticulture--Service Occupations
   _____Agricultural Machinery--Service Occupations

4. Name of module evaluated in this report_____

5. To what group (age and/or class description) was this material presented?____
   _____

6. How many students:
   a) Were enrolled in class (total) _____
   b) Participated in studying this module _____
   c) Participated in a related occupational work experience program while you taught this module _____

7. Actual time spent teaching module:

		Recommended time if you were to teach the module again:
_____hours	Classroom Instruction	_____hours
_____hours	Laboratory Experience	_____hours
_____hours	Occupational Experience (Average time for each student participating)	_____hours
_____hours	Total time	_____hours

(RESPOND TO THE FOLLOWING STATEMENTS WITH A CHECK (✓) ALONG THE LINE TO INDICATE YOUR BEST ESTIMATE.)

	VERY APPROPRIATE	NOT APPROPRIATE
8. The suggested time allotments given with this module were:	
9. The suggestions for introducing this module were:	
10. The suggested competencies to be developed were:	
11. For your particular class situation, the level of subject matter content was:	
12. The Suggested Teaching-Learning Activities were:	
13. The Suggested Instructional Materials and References were:	
14. The Suggested Occupational Experiences were:	

(OVER)

15. Was the subject matter content sufficiently detailed to enable you to develop the desired degree of competency in the student? Yes_____No_____
Comments:

16. Was the subject matter content directly related to the type of occupational experience the student received? Yes_____No_____
Comments:

17. List any subject matter items which should be added or deleted:

18. List any additional instructional materials and references which you used or think appropriate:

19. List any additional Teaching-Learning Activities which you feel were particularly successful:

20. List any additional Occupational Work Experiences you used or feel appropriate:

21. What do you see as the major strength of this module?

22. What do you see as the major weakness of this module?

23. Other comments concerning this module:

_____ _____
(Date) (Instructor's Signature)

_____
(School Address)